

Listing of claims

1. (Currently amended) A monitoring system for a distributed environment including a plurality of hosts capable of executing multiple copies of a scalable application, comprising:
 - means for generating first data corresponding to performance of all copies of the scalable application, by the copies of the scalable application themselves generating the first data and reporting the first data to daemons running on the hosts;
 - means for generating second data corresponding to performance of all hosts in the distributed environment, by host monitor programs running on the hosts; and
 - means for generating performance metrics employed in controlling the managed characteristic applications based on the first and second data.
2. (Currently amended) A monitoring system for a grid system including a plurality of networked hosts capable of executing managed characteristic applications, comprising:
 - means for generating first data corresponding to performance of all managed characteristic applications, by the copies of the scalable application themselves generating the first data and reporting the first data to daemons running on the hosts;
 - means for generating second data corresponding to performance of all networked hosts, by host monitor programs running on the hosts; and
 - means for generating performance metrics employed in controlling the grid system based on the first and second data.
3. (Original) The monitoring system as recited in claim 2, wherein one of the managed characteristic applications comprises a scalable application.

4. (Original) The monitoring system as recited in claim 2, wherein one of the managed characteristic applications comprises a fault tolerant application, where the degree of fault tolerance is selectable by a user.
5. (Original) The monitoring system as recited in claim 2, wherein one of the managed characteristic application comprises a selectable priority application.
6. (Original) The monitoring system as recited in claim 2, wherein one of the managed characteristic applications further responds to user-initiated control actions.
7. (Original) The monitoring system as recited in claim 2, wherein the second data produced by the second data generating means includes network device performance data.
8. (Currently amended) A monitoring system for a distributed environment including N hosts capable of executing M managed characteristic applications, where M and N are positive integers, comprising:
 - application monitor functions instantiated by corresponding ones of the N hosts which generate first data corresponding to performance of the M managed characteristic applications, wherein the application monitor functions run on the M characteristic applications themselves and report the first data to daemons running on the N hosts;
 - host monitor functions instantiated by the N hosts which generate second data corresponding to performance of all hosts in the distributed environment, wherein the host monitor functions run on host monitor programs running on the N hosts; and
 - functions instantiated by selected ones of the N hosts which generate performance metrics permitting control of one of the N hosts and the M managed characteristic applications based on the first and second data.

9. (Original) The monitoring system as recited in claim 8, wherein one of the M managed characteristic applications comprises a scalable application.
10. (Original) The monitoring system as recited in claim 8, wherein one of the M managed characteristic applications comprises a fault tolerant application, where the degree of fault tolerance is selectable by a user.
11. (Original) The monitoring system as recited in claim 8, wherein one of the M managed characteristic application comprises a selectable priority application.
12. (Original) The monitoring system as recited in claim 8, wherein the host monitor functions query all of the N hosts and interconnecting network components on a periodic basis to thereby generate the second data.
13. (Original) The monitoring system as recited in claim 8, wherein the host monitoring functions comprises:
 - N host monitors instantiated by the N hosts which collect extensive operating system-level data for each of the N hosts; and
 - a host discovery function employing Simple Network Management Protocol (SNMP) calls and ping Internet Control Message Protocol (ICMP) calls to determine when a new host comes on-line and if an operating one of the N hosts stops operating.
14. (Original) The monitoring system as recited in claim 13, wherein the N host monitors employ operating system-level mechanisms to retrieve information representing the status, the configuration, and the performance on each of the N hosts.

15. (Currently amended) The monitoring system as recited in claim ~~[[13]]~~ 14, wherein the retrieved information includes:

- operating system version and machine configuration;
- CPU configuration, status, and utilization;
- memory configuration and usage;
- network configuration, status, and utilization;
- filesystem configuration, status, and utilization; and
- process statuses including CPU, memory, network, and file system utilization for each process.

16. (Original) The monitoring system as recited in claim 13, wherein the host monitoring functions further comprise N history server functions which collect data from the N host monitors, respectively, to thereby maintain status and performance histories on each of the N hosts.

17. (Original) The monitoring system as recited in claim 8, wherein:

- the application monitor function further comprises:
 - instrumentation application programming interfaces (APIs) libraries linked to the M managed characteristic applications; and
 - N instrumentation daemons which receive instrumentation data generated by the API calls from the M managed characteristic applications and reformat the instrumentation data into instrumentation event messages; and
 - the first data is generated responsive to the instrumentation event messages.

18. (Original) The monitoring system as recited in claim 17, wherein calls to the API libraries produce respective application performance data for the M managed characteristic applications.

19. (Currently amended) Software stored on at least one host for converting N networked hosts into a resource

managed system instantiating M managed characteristic applications, comprising:

a first function group which monitors the N hosts and network resources, the first function group running on the N hosts;

a second function group which provides general-purpose application event reporting and event correlation capabilities, the second function group running on the M characteristic applications themselves and reporting to daemons running on the N hosts;

a third function group which provides the reasoning and decision-making capabilities for the resource managed system; and

a fourth function group which provides program control capabilities permitting starting, stopping, and configuring of selected ones of the M managed characteristic applications on respective ones of the N hosts in the resource managed system,

wherein:

the first function group includes host monitor functions instantiated by first selected ones of the N hosts which generate first data corresponding to performance of all hosts and network devices in the distributed environment;

the second function group includes application monitoring functions instantiated by corresponding ones of the N hosts which generate second data indicative of performance of the M managed characteristic applications; and

one of first and second function groups provides metric functions instantiated by second selected ones of the N hosts which generate performance metrics based on the first and second data and provides the performance metrics to the third function group.

20. (Original) The software as recited in claim 19, wherein the host monitor functions query all of the N hosts and interconnecting network components on a periodic basis to thereby generate the second data.

21. (Original) The software as recited in claim 19, wherein the host monitoring functions comprises: N host monitors instantiated by the N hosts which collect extensive operating system-level data for each of the N hosts; and
a host discovery function employing Simple Network Management Protocol (SNMP) calls and ping Internet Control Message Protocol (ICMP) calls to determine when a new host comes on-line and if an operating one of the N hosts stops operating.

22. (Original) The software as recited in claim 21, wherein the N host monitors employ operating system-level mechanisms to retrieve information representing the status, the configuration, and the performance on each of the N hosts.

23. (Original) The software as recited in claim 22, wherein the retrieved information includes:

- operating system version and machine configuration;
- CPU configuration, status, and utilization;
- memory configuration and usage;
- network configuration, status, and utilization;
- filesystem configuration, status, and utilization; and
- process statuses including CPU, memory, network, and filesystem utilization for each process.

24. (Original) The software as recited in claim 21, wherein the host monitoring functions further comprise N history server functions which collect data from the N host monitors, respectively, to thereby maintain status and performance histories on each of the N hosts.

25. (Original) The software as recited in claim 19, wherein:
the application monitor function further comprises:

M instrumentation application programming interfaces (APIs) linked to the M copies of the managed characteristic application; and

M instrumentation daemons which receive instrumentation data generated API calls from the M copies of the managed characteristic application and reformat the instrumentation data into instrumentation event messages; and

the first data is generated responsive to the instrumentation event messages.

26. (Original) The software as recited in claim 19, wherein the first function group comprises:

host monitor functions, which reside on and collect operating system-level data each of the N hosts;

history server functions, which collect system-level data from the Host Monitor functions, respectively, maintain status and performance histories on each of the N hosts; and

a host discovery function which uses Simple Network Management Protocol (SNMP) calls and ping Internet Control Message Protocol (ICM) calls to determine when new hosts come on-line and if an operating one of the N hosts ceases to function.

27. (Original) The software as recited in claim 19, wherein the second function group comprises:

instrumentation API Libraries which are linked with the N copies of the managed

characteristic application and provide function call interfaces by which the application copies generate instrumentation data;

instrumentation daemon functions, which reside on each of the N hosts, that read the instrumentation data generated by the N copies of the managed characteristic application, that reformat the data into instrumentation event messages, and that send the event messages to instrumentation collector functions;

the instrumentation collector functions, which are operatively coupled to the instrumentation daemon functions, that forward the received event messages to instrumentation correlator functions and instrumentation broker functions;

the instrumentation correlator functions that provide grammar-driven capabilities for correlating, combining, and reformatting application data into higher-level metrics provided to the third function group; and

the instrumentation broker functions that receive event messages from the instrumentation collector functions and perform task-specific reformatting and data manipulation for driving displays.

28. (Original) The software as recited in claim 19, wherein one of the M managed characteristic applications comprises a scalable application.

29. (Original) The software as recited in claim 19, wherein one of the M managed characteristic applications comprises a fault tolerant application, where the degree of fault tolerance is selectable by a user.

30. (Original) The software as recited in claim 18, wherein one of the M managed characteristic application comprises a selectable priority application.